Amendment to Richards 09/835,543

9 A1 st 2003

Amendments to the passes

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This listing of come will replace all prior versions, and listings, of claims to the application.

Listing of Claims

- 1. (Previously mended) A method for operating an opt. 11 crossbar sv 1ch having a plurality of selectable reflective obtical switching elements, said method comprising:
 - focus: J a selected input light beam on a fir:
 selected relective optical switching element, the irst
 selected relective optical switching element directing
 the selected input light beam to a first output;
 selecting a second reflective optical switching
 element; and
 - varyii a focus of said selected input light am to focus said elected input light beam on said secon selected relective optical switching element, the econd selected relective optical element directing the selected is at light beam to a second output.
- 2. (Previousl Amended) A method as in claim 1, where said focusing coprises varying a focal length of an addive optical element.
- 3. (Original) method as in claim 2 wherein said ada ive optical el ent comprises a variable mirror device
- 4. (Original) method as in claim 2 wherein said ada ive optical el ent comprises a variable lens.
- 5 to 19 (Cancel d).

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20....(Currently Amonded) ** method as in any one of claims as claim 4 and 19 where a said variable lens comprises a variable micro-machi ed membrane lens.

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and,

21. (Previously Amended) n optical crossbar switch for switching input ligh beams, the switch comprising: at least one ac tive optical element having a focal length variable over a range, the adaptive optical element located in a ath of a selected input light beam;

input light beam to outputs;

selected input light eam.

a plurality of electable reflective optical elements, said selective optical elements alternatively select le and interposable in the path of the selected input 1 ht beam to direct the selected corresponding one of a plurality of

wherein more than on of said selectable reflective optical elements are ocated within the range over which said adaptive optica element is capable of focusing said

22. wherein said adaptiv variable mirror devi

(Original) An optica crossbar switch as in claim 21, optical element comprises a

23. wherein said adaptiv variable lens.

(Original) An optica crossbar switch as in claim 21, optical element comprises a

24. (Previously Amended) claim 23 wherein sai micro-machined membr

n optical crossbar switch as in variable lens comprises a variable e lens.

25. (Previously Added) A signal from an input plurality of output

apparatus for directing an optical hannel to a selected one of a annels, the apparatus comprising:

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a plurality of individue switchable reflective elements located to intercept a optical signal from the input channel, the plurality having a plurality of selecta configurations, each of the configurations directing corresponding one of the outp configurations the optical sic one of the reflective element:

at least one adjustable : optical path between the input of reflective elements, the at optical element configured to onto a currently selected one and, upon a different one of t becoming the currently selecte elements, to vary a focus of t element to focus the optical s one of the reflective elements

reflective elements e optical signal to a channels, in each of the il incident on a selected and,

us optical element in an channel and the plurality east one adjustable focus cus the optical signal the reflective elements reflective elements one of the reflective adjustable focus optical nal onto the different

- 26. (Previously Amended) An appara wherein each of the plurality corresponds to one of the plur and in each of the configurati reflective elements is the ref corresponding to the correspon
- s according to claim 25, reflective elements ity of output channels 3 the selected one of the stive element ng output channel.
- 27. (Previously Added) An apparatu wherein each of the plurality reflective elements is moveable state and a non-reflective sta-

according to claim 26 individually switchable etween a reflective

28. (Previously Added) An apparatu: wherein each of the plurality c reflective elements comprises : substantially flat orientation upright orientation and when the

according to claim 27, individually switchable ember movable between a d a substantially reflective element is in

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pright orientation.

- 29. Previously Added) An apparatus accord g to claim 25, herein each of the plurality of indiv ually switchable effective elements comprises a micro-r chined mirror.
- 30. Previously Added) An apparatus accord: j to claim 25, herein the adjustable focus optical element comprises ne of: an adjustable focus reflective lement and an djustable focus transmissive element.
- Previously Added) An apparatus according to any one of laims 25, 26 and 28 comprising a plure ity of second djustable focus optical elements each ocated in an ptical path between the plurality of a flective elements and a corresponding one of the output connels.
- 32. Previously Added) An apparatus according to claim 31 comprising a plurality of collimating lases, each of the collimating lenses disposed in an optical path between the of the plurality of second adjustable focus optical telements and a corresponding output chantel.
- 33. Previously Added) An apparatus according to any one of claims 25, 26 and 28 comprising a collinating lens cisposed between the input channel and se at least one significant apparatus according to any one of claims 25, 26 and 28 comprising a collinating lens cisposed between the input channel and se at least one claims according to any one of claims 25, 26 and 28 comprising a collinating lens cisposed between the input channel and se at least one claims according to any one of claims 25, 26 and 28 comprising a collinating lens cisposed between the input channel and se at least one claims according to any one of claims 25, 26 and 28 comprising a collinating lens cisposed between the input channel and se at least one claims according to any one of claims 25, 26 and 28 comprising a collinating lens cisposed between the input channel and se at least one claims according to the collinating lens cisposed between the input channel and se at least one claims according to the collinating lens cisposed between the input channel and se at least one claims according to the collinating lens cisposed between the input channel and se at least one claims according to the collinating lens cisposed between the input channel and se at least one claims according to the collinating lens cisposed between the cisposed bet
- 34. Previously Added) An apparatus accordi / to claim 25 vaerein the input channel comprises an otical fiber.
- 35. Previously Added) An apparatus accordi to claim 25 verein the plurality of individually stchable effective elements comprises a linear ray of micro-rachined mirrors.

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state ar

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	. (Provinga	a plurality of input channels wherei of individually switchable reflective a plurality of linear arrays of micro he plurality of linear arrays includi responding to each possible combinati	the lements achined a of one
	of the	ut channels and one of the output cha-	:ls.
37.	(Previo wherein liquid	y Added) An apparatus according to cle e adjustable focus optical element constal lens.	1 25, cises a
38.	(Currensignals a)	Amended) A switch for switching option mprising: rality of optical input channels and a of optical output channels;	
	a } element: reflect:	rality of individually switchable refleach of which is switchable between a state and a non-reflecting state; and	:tive
	a peach of optical optical	rality of adjustable focus optical elements in the between a corresponding one of the annels and the plurality of individual	nts, in
	switchak focus of signal 1 onto any	reflective elements, each of the adjustal elements capable of focusing an or the corresponding one of the input one of a plurality of the plurality of	able cal nnels
	individu pluralit reflecti setting	y switchable reflective elements , each of the plurality of individually switch elements located to require a different the adjustable focus optical element;	of the
	wherein one of t the outr	optical signal may be directed from a input optical channels to a selected optical channels by switching a selectality of reflective elements to its r	elected e of d one lecting

djusting a focus of the at least one

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2800 adjustable focus tical element corresponding to the selected input or ical channel to focus the optical signal onto the s lected reflective element.

actuating a output channels;

39. (Previously Addec A method for directing an optical signal from an ir at channel to a selected one of a plurality of outp : channels, the method comprising: oflective element to direct an optical signal from the i but channel to a selected one of the id,

operating an adjustable focus optical element to focus the optical signal from the input channel onto the reflective elemen

40. (Currently Amende reflecting state.

A method according to claim 39, wherein actuating he reflective element comprises moving the reflective el lent between a position wherein the reflective elemen is in a non-reflecting state and a position wherein c reflective elements element is in a

flipping the refl orientation to a

41. (Previously Added A method according to claim 40, wherein actuating he reflective element comprises tive element from a substantially flat bstantially upright orientation.

42. (Previously Added A method according to claim 39, wherein the reflective element comprises a micro-machined mirror.

43.

(Previously Added A method according to any one of claims 39 and 40 . mprising providing a second adjustable focus optical eler at in an optical path between the reflective elemen and the selected one of the output channels and adju: ing a focal length of the second

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adjustable focus optical mement to couple the optical signal to the selected one of the output channels.

44. (Previously Added) The met switching the optical sign output channels to a diffe by:

from the selected one of the nt one of the output channels

d of claim 39 comprising

deactivating the refl different reflective eleme

tive element and activating a ; and,

adjusting the adjustation focus the optical signal and element.

- e focus optical element to o the different reflective
- 45. (Previously Added) A methom wherein activating the discomprises switching the data a non-reflecting state to
- according to claim 44, rent reflective element erent reflective element from reflecting state.
- 46. (Currently Amended) A methalism as selected one channels to a selected one channels comprising:

for directing an optical faplurality of input faplurality of output

actuating a reflective selected input and output

element corresponding to the annels; and,
us of an optical signal from

the selected input channel onto the actuated reflect:

o focus the optical signal from element.

47. (Currently Amended) The metocusing an altering the the selected input channel comprises adjusting a variation of the channel and the reflective

od of claim 46 wherein

us of the optical signal from

nto the reflective element

le focus optical element

between the selected input

lement.

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(Previously Added) The method of comprising adjusting a second variable focus c disposed in an optical path betweer element and the selected output cha el to couple the optical signal to the selected outp

ical element he reflective channel.

(Previously Amended) A method for r beam in an optical crossbar switch of individually selectable reflecti elements, the method comprising:

irecting a radiation mprising a plurality optical switching

focusing a selected radiation selected reflective optical switchi am on a first element; tical switching

selecting a second reflective element; and,

ocam on the second

focusing the selected radiatio reflective optical switching elemen